Multidisciplinary Approach in the Management of Complicated Crown Fracture

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ABSTRACT

Aim: To highlight the importance of multidisciplinary approach in the management of complicated crown fracture of permanent maxillary right lateral incisor.

Introduction: A complicated crown fracture with biological width invasion was successfully managed.

Case report: Clinically, the patient presented with a subgingival fracture of the right lateral incisor, with a tooth fragment below the cementoenamel junction. The initial examination suggested a multidisciplinary approach. The decision of an orthodontic root extrusion after endodontic treatment was made.

Conclusion: The orthodontic extrusion of 2 mm was achieved in endodontically treated tooth followed by restoration of tooth by porcelain crown.

Clinical significance: There are benefits of the custom-made post and core fabrication with the modification in the arch wire to achieve favorable tooth extrusion and post crown restoration.

Keywords: Crown fracture, Multidisciplinary, Root extrusion.

CASE REPORT

A 14-year-old boy in good general health presented to the Department of Pedodontics and Preventive Dentistry at our hospital for treatment of a fractured right lateral incisor after 24 hours of the fall. Patient gave history of fall while playing. On clinical examination, lateral incisor (12) had Ellis’ class IV fracture and right central incisor (11) had Ellis’ class III fracture. Intraoral periapical radiograph (iOPAR) of right lateral incisor revealed an extensive subgingival fracture at the level of cementoenamel junction (Figs 1 and 2).

The multidisciplinary treatment approach was planned, wherein the fractured fragment of lateral incisor was removed, and root canal treatment was carried out for both maxillary right central and lateral incisors.

In 12 post, space was created by removal of gutta-percha with the help of peeso reamers and H-files.
leaving behind 5 mm of gutta-percha at the apical end. The custom-made post with modifications to engage the elastics during orthodontic extrusion was fabricated, instead of usual J-hook.

The impressions of post and core were made using a wooden toothpick (Fig. 3). A thin coat of sticky wax was applied after lubricating the inner walls of the core, and the entire length of the canal was recorded adding the wax in increments. After obtaining the core pattern, elastomeric impression was made with the wax pattern mounted on the tooth. A customized metal cast post with horizontal slit in the core of the post to engage elastics and ligature wires was made and cemented using zinc phosphate cement.

Orthodontic Treatment Progress

The treatment comprised of single-phase therapy with MBT 0.22 slot bracket placements from 15 to 25. Ligature consolidation was done from 15 to 25 to prevent intrusion of the adjacent teeth while extrusion of 12 was carried out.

A 0.16 AJ Wilcock wire was placed, with slight modification in the wire between 11 and 13 so that the range of action between the ligature tie on the cast post to the main arch wire was in sufficient quantity and the extrusion of 12 happens more favorably (Figs 4 and 5). Monthly activation of 12 was done for five visits (5 months).

Treatment Results

Intraoral periapical radiograph made after 2 months revealed widening of periodontal space. The follow-up IOPAR after 5 months revealed apposition of the bone at the apex of 12 with the extrusion of the tooth up to 2 mm (Figs 6 and 7).

Orthodontic Extrusion Follow-up

The modification of the core to engage elastics was blocked with modified glass ionomer cement, and tooth preparation of 11 was done and the impression was made using elastomeric impression material for porcelain...
crowns. The crowns were cemented in relation to 11 and 12 (Figs 8 and 9).

DISCUSSION

The number, type, and severity of dental injuries differ according to the age of the patient and the cause of the accident. The maxillary central incisors were the most frequently injured teeth in all studies. Researchers reported the maxillary lateral incisors as the second most frequently injured teeth. When tooth structure has been lost to the level of the alveolar crest or beyond due to trauma, the tooth cannot be restored satisfactorily. The placement of gingival line of the crown subgingivally will create problem of ill-fitting crown and placement of the margin in an area that would violate the “biological width” of the soft tissue attachment. In order to improve adequate biological width, an alternative approach is orthodontic extrusion.

It is well known that extrusive movement produces forces on the periodontal fibers in the same direction as the movement, thus resulting in new bone apposition as the tooth moves coronally. At the same time, it also enhances soft tissue volume by increasing the amount of attached gingiva. Furthermore, to increase the success of this nonsurgical technique, cooperation among a pediatric dentist, a periodontist, and an orthodontist is a necessity. When a light force is used for forced extrusion, the bone and the gingiva surrounding the extruded tooth migrate.
coronally. Gingival and periodontal ligament fibers are stretched during forced eruption, promoting coronal gingival repositioning and new bone apposition in the direction of movement.9

A permanent custom-made post with a hook modification was used to dowel core because the root will remain susceptible to fracture without the crown encircling the tooth apical to the core in the dowel core. The ferrule effect achieved by the custom-made post and core reduces the chances for root fracture.10

Apposition of the bone represents retained osseous support and stability of the gingival tissues around a tooth, without any gingival recession or exposure of the crown margin. Apposition of the bone in the periapical region of extruded 12 was observed. This is somewhat similar to the labial gingival dimensions in the horizontal and vertical dimensions, if a labial orthodontic movement is performed in order to place a root into a more proper position within the alveolar bone limits.10 This movement was achieved in the extrusion of maxillary right lateral incisor, by placing a modified arch wire bend between maxillary right central incisor and maxillary right canine.

CONCLUSION
A multidisciplinary approach in the management of complicated crown fracture aids to achieve better esthetics. In this case report, cooperation of multidisciplinary specialists is highlighted in the management of a complicated crown fracture of right lateral incisor.

CLINICAL SIGNIFICANCE
• A permanent custom-made post with modification in the hook was used to dowel post core to reduce the susceptibility of root fracture.
• Modification in the wire between right lateral incisor and right canine was made so that the range of action between the ligature tie on the cast post to the main arch was in sufficient quantity to achieve favorable extrusion.

REFERENCES